4. Jacob

Program Name: Jacob.java **Input File: jacob.dat**

Jacob is fascinated with Math and recently learned that the Math constant π or **pi** is an irrational number that is approximately 3.14159265… and it can be computed to desired precision using the following math series:

$$\pi \approx 3 + \frac{4}{2 \times 3 \times 4} - \frac{4}{4 \times 5 \times 6} + \frac{4}{6 \times 7 \times 8} - \frac{4}{8 \times 9 \times 10} + \cdots$$

Jacob is better with Math than Java programming and has asked for your help computing approximations of π using a variety of number of terms after the initial value of 3. The above expression would be the approximation using 4 terms and produces the first value shown below in the sample output.

Input: First line will contain a positive integer **N**, the number of test cases with $0 \leq$ **N** ≤ 25. The following **N** lines will contain a single positive integer **T**, the desired number of terms following the initial value of 3 to include in the approximation with $0 \leq$ **T** ≤ 1000.

Output: For each test case, display the computed approximation of π with 13 digits after the decimal point.

Sample input:

```
5
4
7
23
101
911
```

Sample output:

```
3.1396825396825
3.1420718170718
3.1416106990405
3.1415928891421
3.1415926539194
```